

COMPUTER CONTROLLED USER INTERACTIVE DISPLAY INTERFACE  
IMPLEMENTATION FOR MODIFYING THE SCOPE OF SELECTIVITY  
OF AN ON-SCREEN POINTER

Cross Reference:

5 United States Patent Applications: TEMPORARILY  
MOVING ADJACENT OR OVERLAPPING ICONS AWAY FROM SPECIFIC  
ICONS BEING APPROACHED BY AN ON-SCREEN POINTER ON USER  
INTERACTIVE DISPLAY INTERFACES (Attorney Docket No. AUS9-  
2001-0345-US1); DIRECTING USERS' ATTENTION TO SPECIFIC  
10 ICONS BEING APPROACHED BY AN ON-SCREEN POINTER ON USER  
INTERACTIVE DISPLAY INTERFACES (Attorney Docket No. AUS9-  
2001-0336-US1); and COMPUTER CONTROLLED USER INTERACTIVE  
DISPLAY INTERFACE IMPLEMENTATION FOR MODIFYING THE SCOPE  
OF SELECTIVITY OF AN ON-SCREEN POINTER (Attorney Docket  
15 No. AUS9-2001-0343-US1), all mailed and filed on July 5,  
2001, and all having the assignee of the present  
application.

Technical Field

20 The present invention relates to user interactive  
computer supported display technology and particularly to  
such user interactive systems and methods that are user  
friendly and provide computer users with an interface  
environment that is easy to use, even in displays which  
are crowded with icons.

25 Background of Related Art

The past decade has been marked by a technological  
revolution driven by the convergence of the data  
processing industry with the consumer electronics  
industry. This advance has been even further accelerated  
30 by the extensive consumer and business involvement in the

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Internet or World Wide Web (Web) over the past several years. The terms Internet and Web are used interchangeably throughout this application. As a result of these changes, it seems as if virtually all aspects of human endeavor in the industrialized world require human-computer interfaces. These changes have made computer directed activities accessible to a substantial portion of the industrial world's population, which, up to a few years ago, was computer-illiterate, or, at best, computer indifferent.

In order for the vast computer supported industries and market places to continue to thrive, it will be necessary for increasing numbers of workers and consumers who are limited in computer skills to become involved with computer interfaces.

Despite all of the great changes that have been made in the computer industry, the screen cursor controlled manually by the user still remains the primary human-computer interface. The user still commands the computer primarily through manual pointing devices such as mice, joy sticks and trackballs that control the on-screen cursor movements. It must be noted that the principles involved in such pointing devices were developed over a generation ago when most of the people involved in interfaces to computers were computer professionals who were willing to invest great amounts of time in developing computer skills. It is very possible that had computers originally been the mass consumer, business and industry implements which they are today, user interfaces that were much easier and required less skill to use would have been originally sought and developed. Nonetheless, the manually controlled cursor movement devices are our primary access for cursor control. The

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## Summary of the Present Invention

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the completion of the modification, the scope may be returned to its hidden state. The scope may also be modified through user interactive dialog means involving interactive selections from displayed menus and dialog boxes.

#### Brief Description of the Drawings

The present invention will be better understood and its numerous objects and advantages will become more apparent to those skilled in the art by reference to the following drawings, in conjunction with the accompanying specification, in which:

Fig. 1 is a block diagram of a generalized data processing system including a central processing unit that provides the computer controlled interactive display system which may be used in practicing the present invention;

Fig. 2 is a diagrammatic view of a display screen illustrating an example of a cursor movement toward a target icon in a crowded icon environment with the normally hidden scope of the cursor shown in dashed lines;

Fig. 3 is the view of Fig. 2 during the cursor scope modification method of this invention whereby the scope is displayed;

Fig. 4 is the view of Fig. 3 at a subsequent cursor scope modification stage wherein the cursor itself is used to modify the cursor scope;

Fig. 5 is a partial view of Fig. 4 at a subsequent modification stage wherein the scope of the cursor has been reduced in size by the modification;

Fig. 6 is the partial view of Fig. 5 upon the completion of the cursor scope modification wherein the

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accordance with this invention;

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changing the scope of a cursor; and

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### Detailed Description of the Preferred Embodiment

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Corporation (IBM) or Dell Corp., is provided and interconnected to various other components by system bus

12. An operating system 41 runs on CPU 10, provides control and is used to coordinate the function of the various components of Fig. 1. Operating system 41 may be one of the commercially available operating systems such as Microsoft's Windows98™ or WindowsNT™, as well as the UNIX or IBM's AIX operating systems. An application program for permitting the user to display and then modify the scope of his cursor to be subsequently described in detail, runs in conjunction with operating system 41 and provides output calls to the operating system 41, which in turn implements the various functions to be performed by the application 40. A Read Only Memory (ROM) 16 is connected to CPU 10 via bus 12 and includes the Basic Input/Output System (BIOS) that controls the basic computer functions. Random Access Memory (RAM) 14, I/O adapter 18 and communications adapter 34 are also interconnected to system bus 12. It should be noted that software components, including operating system 41 and application 40, are loaded into RAM 14, which is the computer system's main memory. I/O adapter 18 may be a Small Computer System Interface (SCSI) adapter that communicates with the disk storage device 20, i.e. a hard drive. Communications adapter 34 interconnects bus 12 with an outside network enabling the data processing system to communicate with other such systems over a Local Area Network (LAN) or Wide Area Network (WAN), which includes, of course, the Internet. I/O devices are also connected to system bus 12 via user interface adapter 22 and display adapter 36. Keyboard 24 and mouse 26 are all interconnected to bus 12 through user interface adapter 22. Mouse 26 operates in a conventional manner insofar as user movement is concerned. Display adapter 36 includes a frame buffer

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52. When the user picks item 54 "Cursor Scope" from the menu bar, then, as shown in Fig. 3, the hidden cursor scope 53 becomes visible and even highlighted. This selection of item 54 may be made with the cursor itself or the selection may be made using the keyboard.

At this point, the visible scope 53 may be modified using any conventional graphics techniques, i.e. as shown in Fig. 4 the cursor itself may be used, the cursor shown as cursor 56 is moved from its original position 52 indicated in dashed lines along path 55 to the lower side of scope 53. Then, as shown in the partial enlarged view of Fig. 5, the cursor continues to push the lower side until the area of scope 53 is greatly reduced. When the user has completed his modification of scope, he may indicate this by again pressing the Cursor Scope item 54 on the menu bar (Fig. 4), and, as shown in Fig. 6, modified scope 53 again resumes its normally hidden state and cursor 52 is returned to its original position from which it may continue its approach to its target icon with more optimum scope.

Figs. 7 through 9 are shown to illustrate other types of pointer or cursor scope modification which may be made in the present invention. In Fig. 7, a triangular scope area 57 is changed to a rectangular area 58, an example of a change in geometric configuration. In Fig. 8, an elongated rectangle scope 59 is initially in a horizontal position. This is an optimum position if the cursor 52 were to be used in selecting a group of relatively wide icons arranged in vertical columns; the cursor 52 could sweep its scope 59 vertically up a column of icons. Then, if circumstances change, and the cursor 52 were to be used to select a similar group of icons in a row, the position of the scope could then be modified

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An illustrative running of the process of Fig. 11 will now be described with respect to Fig. 12. First,

5 step 80, the cursor is moved in the direction of an icon  
that the user wishes to select. A determination is made,  
step 81, as to whether the user feels that the default or  
normal scope of his cursor is likely to be satisfactory  
in the display screen environment. If the user is  
10 satisfied with the scope, the determination from step 81  
is No, he does not need to view the cursor scope, and he  
continues to move the cursor, step 80. If the  
determination from step 81 is Yes, the user needs to view  
the cursor scope, he displays the scope, step 82, and  
15 then makes a determination, step 83, as to whether the  
scope is such that he needs to modify it in order to  
optimize his cursor navigation and selection in the  
present icon distribution environment, then the  
determination is Yes, the process for modification is  
20 enabled so that the user may make suitable modifications,  
step 84. Upon the completion of the modification as  
determined in step 85, the new scope of the cursor is  
stored, step 86, and the displayed cursor scope is again  
hidden, step 87. If at step 83, the user had decided No,  
25 then the scope need not be modified and he continues to  
move the cursor, step 80. Upon the completion of step  
87, a determination may conveniently be made as to  
whether the session is at an end, step 88. If Yes, the  
session is exited; if No, the process is branched back to  
30 step 80 where the user continues to move the cursor.

In the example given, the displayed scope of the cursor is hidden after it is modified. The scope of the cursor need not be hidden during any navigation or

selection process. It may remain visible during such processes. Also, the pointer or cursor is shown only pointing a single direction. It should be understood that the pointer may be pointed in any desired direction, and, particularly, in the direction of navigation. IBM copending application Serial No. 09/282,635, filed March 31, 1999, entitled A Graphical User Interface for a Computer Oriented Display With a Self-Orienting Pointing Cursor, M. F. Davis et al., assigned to the assignee of the present invention, hereby incorporated by reference, discloses examples of such pointers.

One of the implementations of the present invention is as an application program 40 made up of programming steps or instructions resident in RAM 14, Fig. 1, during computer operations. Until required by the computer system, the program instructions may be stored in another readable medium, e.g. in disk drive 20 or in a removable memory, such as an optical disk for use in a CD ROM computer input or in a floppy disk for use in a floppy disk drive computer input. Further, the program instructions may be stored in the memory of another computer prior to use in the system of the present invention and transmitted over a LAN or a WAN, such as the Internet, when required by the user of the present invention. One skilled in the art should appreciate that the processes controlling the present invention are capable of being distributed in the form of computer readable media of a variety of forms.

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Although certain preferred embodiments have been shown and described, it will be understood that many changes and modifications may be made therein without departing from the scope and intent of the appended

5 claims.

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